

Claims 1-12 are rejected under 35 USC 103(a) as being unpatentable over the admitted prior art (hereinafter Jiang) in view of Chang.

Informalities Are Addressed

Applicant thanks the Examiner for noting the incorrect Serial No at page 1, and this is corrected herein in the Specification.

Claims Rejections under 35 USC §103

The Rejection of Claims 1-13 on Chang is Overcome

Chang does not teach the invention that is disclosed and claimed in the Application. The Office Action on page 4 states the "Chang teaches a brazed component assembly comprising metal parts which are bonded together by a compact filler material comprising laminated foil layers (col. 2, ln. 38-45)." However, at the cited location, Chang teaches only a brazing strip or foil having layers of titanium and other metals that are roll bonded without annealing. Chang does not teach how to use the brazing foil or how to make a component assembly. Nor does Chang teach what materials may be brazed and specifically, Chang does not mention stainless steel at all or it bonding to titanium metal. Chang does not teach how to make a component assembly that is suitable for use in living tissue, as is taught in the Application.

Chang does not differentiate between the copper containing brazing foils and the nickel containing brazing foils. Chang does not teach how to choose the preferred brazing material for implantation. Moreover, Chang does not teach the basis for the selection of titanium, nickel or copper brazing foils. It is known to Applicants that copper is not a biocompatible material and consequently would not choose copper for implantation in living tissue.

Furthermore, Chang does not teach materials selection criteria, applications, or candidates to achieve successfully brazing with the disclosed brazing foils. Chang specifically is silent on the disclosure of bonding titanium to stainless steel, which is taught by Applicants.

Chang does not teach "...a brazed component assembly comprising a 316 stainless steel metal part bonded to a composite filler material...." at col. 6, ln 52-57, as is stated in the Office action at page 4. As stated above, Chang teaches brazing foils. At the cited location Chang teaches brazing foils that are roll bonded to very thin brazing materials that contain a layer having an initial thickness of 0.040 inch 316 stainless steel. Chang does not teach component assemblies but rather brazing materials. At the cited paragraph Chang teaches Ni/Ti/Ni strips to a 316 stainless steel strip.

Chang does not teach a titanium metal part being bonded to form a composite assembly, as is stated in the Office Action [citing to col. 6, ln. 65-67]. Chang teaches the formation of a five layer braze foil that contains titanium alloy in the form of Beta-21 alloy strip. These thin foils have limited structural capabilities and are not assemblies of components or composite structures; they are thin (less than 0.001 inches) foils.

Bonding stainless steel to titanium by brazing is non-obvious prior to the Applicants' invention and is not taught by Chang. Bonding a stainless steel part to a titanium part via brazing, which by definition involves heating to greater than 450°C and using a filler metal distributed between the surfaces to be joined [Metals Handbook Desk Edition, American Society for Metals, 1985], is not obvious in view of Chang since Chang fails to mention using any braze metal to cause such a bond to occur. Further, Chang provides no motivation to select a braze filler material to accomplish such a brazed bond between the dissimilar metals of interest.

The Office Action avers at page 4 that "...Chang has the same structure and same materials as that claimed by Applicant..." and hence the Office Action concludes that Chang leads to the use of his structure and materials for use in living tissue. However, as discussed above, Chang teaches neither implantable device, materials, or processes that are suitable for such use. Applying the teaching of Chang to design and fabrication of an implantable brazed device is a leap too great for one having ordinary skill in the art to make. If anyone did make this leap, they have not made themselves known.

Dependent claims 2, 3, 5-9 are allowable as further limitations on an allowable independent claim.

Claim 4 is also allowable as containing a further limitation on an allowable independent claim 1. In rejecting claim 4 the Examiner finds no patentable distinction over Chang since, in the Examiner's view, the order in which foil layers are stacked to form the laminate filler is merely a design choice. Chang certainly does not teach the merits of the order in which the laminate layers in a braze foil are stacked. Chang does teach away from the claimed invention since Chang prefers to place the Ti somewhere in a middle layer to protect it from scaling and corrosion when the foil is thermally processed. [col. 7, ln. 65-col. 8, ln. 6] Chang teaches the Ti layer in the middle of the Cu/Ni layer.

Applicants advantageously teach the preferred embodiment of the outer layers of a foil being comprised of nickel, Application page 2, para. 2. The selection of nickel is not merely a random choice. Certainly Applicants are unaware of how one having ordinary skill could derive the claimed invention based upon the teaching of Chang. Chang is silent regarding a preferred orientation with nickel on the outside of the foil layers in the application of interest. Chang fails to teach this and, further, it is not obvious given the novelty of the claimed invention.

Claim 10 is rejected based on Chang having taught heating the foil at about 950°C, referring to col. 7, ln. 1-5 and col. 8, ln. 7-19. While claim 10 is allowable as containing a limitation to an allowable claim, it is important to note that Chang does not teach a brazing temperature for bonding components together with a brazing foil. Chang teaches a method of producing a brazing foil where one step is to thermally process the foil alone while not being in contact with parts that are to be bonded by brazing. Looking at col. 8, ln. 7-19, for example, Chang describes the multi-layer brazing alloys of either Cu or Ni being processed at about 942°C.

Without repeating the above arguments, claims 11, 12 are allowable as containing further limitations to allowable independent claim 1. Further, contrary to the Office Action explanation for rejection on page 6, Chang does not teach forming an "assembly" let alone the formation of a brazing foil by other than roll

forming processes. Chang is silent with regard to the terms: particulate, particle, sputtering, evaporating, or ion beam enhanced deposition.

The Rejection of Claim 13 on Chang in view of Cusano is Overcome

Claim 13 is allowable as containing a limitation on an allowable claim. The Examiner contends that Cusano teaches that the laminate brazing foil layers are formed of metallic particulate. Cusano teaches bonding metal to either metal or ceramic with a particulate copper oxide that is preferably mixed with an appropriate vehicle, namely an organic compound. [col 3, lines 20-30; col 10, lines 33-50] It is well known to those skilled in the art to apply the bonding agent/brazing filler metal in the form of foil or in the form of particulate. Cusano merely restates this teaching. Cusano also teaches that the particulate can be deposited by painting or silk screenings, which are known techniques of applying pastes and particulate as a liquid to a surface. [col 10, lines 39-40]

The Applicants teach that the discrete layers of laminate metal foil are comprised of particles, namely, particles of nickel or a nickel alloy and particles of titanium or a titanium alloy in the form of a foil.

Cusano also teaches that the bond is a direct bond with no intermediate layer of solder metal or the like. [col 2, lines 32-35] Applicants teach that there is a filler material between the titanium and the stainless steel parts.

Given that the Application teaches a titanium part that is bonded to a stainless steel part, it is instructive that Cusano is silent on this bonded system.

Cusano teaches that "[i]t is, of course, realized by those skilled in the art that not all metals will bond to all substrates. [col 3, lines 31-32] Cusano teaches that "[h]owever, oxygen will not function as a bonding agent to bond copper to stainless steel. Sulphur will effectively function as a bonding agent between copper and stainless steel...." [col 3, lines 37-42] Cusano continues with "Nevertheless, as stated above, it is well known to those skilled in the direct bonding art that not all possible combinations of metal, substrate and bonding agent will bond. [col 3, lines 48-51] Lastly, Cusano states "[i]t should be realized that simply bringing any metal 21 and any substrate 22 together and forming a

eutectic melt therebetween is not sufficient to insure bonding on cooling." [col 5, lines 29-32]

Cusano teaches replacing the foil with particulate and fails to teach a foil comprised of metal particulate. Claim 13 is allowable over Cusano.

Chang and Cusano Do Not Contain Any Justification to Support their Combination, Much Less in the Manner Proposed

With regard to the proposed combination of Chang and Cusano, it is well known that in order for any prior-art references themselves to be validly combined for use in a prior-art 103 rejection, the references themselves (or some other prior art) must suggest that they be combined, e.g., as was stated in In re Sernaker, 217 U.S.P.Q. 1, 6 (C.A.F.C. 1983):

"[P]rior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from combining their teachings."

That the suggestion to combine the references should not come from Applicant was forcefully stated in Orthopedic Equipment Co. v. United States, 217 U.S.P.Q. 193, 199 (CAFC 1983):

"It is wrong to use the patent in suit [here the patent application] as a guide through the maze of prior art references, combining the right references in the right way to achieve the result of the claims in suit [here the claims pending]. Monday morning quarterbacking is quite improper when resolving the question of nonobviousness in a court of law [here the PTO]."

As was further stated in Uniroyal, Inc. v. Rudkin-Wiley Corp., 5 U.S.P.Q.2d 1434 (C.A.F.C. 1988), "[w]here prior-art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself.... Something in the prior art must suggest the desirability and thus the obviousness of making the combination." [emphasis added]

In the present case, there is no reason given in the Office Action to support the proposed combination. The fact that both references teach the use of bonding

assisting agents is not sufficient to gratuitously and selectively substitute parts of one reference for a part of another reference in order to meet Applicants' novel claimed combination.

The Applicants present novel results that are neither anticipated nor disclosed by either Chang or Cusano alone or in combination. Based on Chang and Cusano, the results of the Application are unexpected and are not a mere design choice.

The Rejection of Claims 1-12 on Jiang ("Admitted Prior Art") in view of Chang is Overcome

Jiang claim 30 is a Jepson claim that describes the prior art that Applicants have practiced and that is known to Applicants and the improvements thereon. The improvements of claim 30 are the utilization of laminated filler material having layers of titanium and nickel and bonding at between 940°C and 1260°C for stainless steel to titanium implants. Applicants are aware of the advantages of utilizing stainless steel and titanium components in living tissue and improved upon alternative processes as taught in the Application. It is the improvements to the known, unsatisfactory bonding practices that Applicants teach. Claim 1 is allowable over the preamble of claim 30 by virtue of the limitation to the specific laminated filler material, which is not known in the art.

In view of all of the foregoing, it is respectfully submitted that the pending claims 1-13 are allowable as amended and in the present application.
Reexamination and allowance are respectfully requested.

SPECIFICATION

The Specification is amended as follows:

The Cross Reference to Related Application section is amended to correct the Application Serial number and to make editorial changes.

The Brief Description of the Drawings section is amended to delete references to FIGS. 5 and 6 and to renumber FIGS. 7 and 8.

The Detailed Description of the Preferred Embodiment is amended to delete two paragraphs on pages 4 and 5. Two paragraphs on pages 6 and 7 are amended to correct the FIG. numbers from FIGS. 7 and 8 to FIGS. 5 and 6, respectively.

CLAIMS

The claims are restated with the restricted claims 14-30 having been withdrawn.

DRAWINGS

The drawings are represented with Figs. 5 and 6 omitted and Figs. 7 and 8 renumbered. No other changes are made to the drawings.

In view of all of the foregoing, it is respectfully submitted that the pending claims 1-13 are allowable as amended and in the present application. Reexamination and allowance are respectfully requested.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California area telephone number (661) 702-6814 to discuss the steps necessary for placing the application in condition for allowance.

Respectfully submitted,

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Date



Gary Schnittgrund
Attorney for Applicant
Reg. No. 42,130

The Alfred E. Mann Foundation for Scientific Research
PO Box 905